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Research Article

Digital Literacy Is a Key Factor in Bridging the Digital Divide in Indian Higher Education

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Abstract

In this age of rapidly increasing technological prominence and adoption, one must be able to use Information and Communication Technology (ICT) technology and apparatuses in conjunction with the Internet to search, evaluate, apply, distribute, and cultivate concepts in a responsible and ethical manner. Digital literacy is the name given to this novel human quality. For everyone to survive and prosper in the digital world today, digital literacy is a crucial part of both their lives, personal and professional. Higher education institutions are leveraging this idea to promote digital literacy globally. It is a major aspect of closing the digital divide in higher education. This review assessed 15–31 research publications using different statistical methodologies based on internet users and non-users. The bridging of the digital gap between students in rural and urban areas and across socioeconomic levels is examined in this review using a novel statistical approach.

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1. INTRODUCTION

Every individual has the essential right to a top-notch education, which is considered the cornerstone of any nation. By decreasing poverty and enhancing health, gender equality, peace, and stability in one's life, it has the power to transform an individual's life [1]. Beyond its conventional boundaries, education becomes the focal point of everything we do. We are aware of everything we do, and we have acquired this knowledge through either instruction or assimilation and observation [2]. Knowledge and society are inextricably linked because education is vital and unifies society [3]. Our empowerment is aided by a good education. It is the most effective instrument for changing society. After China and the United States, India boasts the third-largest higher education system [4]. Higher education in India

and around the world is currently dealing with a variety of issues, some of which existed even prior to the COVID-19 pandemic [5]. The 21st century, sometimes referred to as one illustration of the progress of education, is the "Digital Era," and those who inhabit it—especially those in the educational field—are referred to as "Digital Natives" [6]. Students in higher education need to be digitally literate. We are particularly interested in the scenario when professors are unwilling to continuously adopt new technologies while students are regularly learning new ones (some more valuable than others) [7]. Internet-enabled gadgets are being used more and more frequently, which makes it easier to browse the web, access social media, and communicate across borders [8]. More people worldwide can now access educational learning resources thanks to this new technology. ICT has

impacted education at all levels in recent decades, allowing students to meet the established learning objectives. Of these, higher education is somewhat more impacted. Students who get high-quality, pertinent higher education can acquire the competencies, information, and abilities necessary to succeed in life. It is gradually getting better in India, and technology is a big part of that [9, 10, 11]. These include Shiksha.com, E-yantra, E-Shodh Sindhu, E-PG Pathshala, Virtual Labs, EDUSAT satellite, National Mission on Education via Information and Communication Technology, and National Program on Technology Enhanced Learning [12]. It is possible to obtain insight into how institutional tensions surrounding technology can impede its seamless adoption by investigating how college students utilize the Internet for learning [13]. In this instance, students are frequently bored or unhappy with technological possibilities, while faculty members seem to be constantly catching up to technology [14]. This circumstance supports the widely held belief that taking into account just the digital divide of access is insufficient [15]. Another aspect of the digital divide is the disparity in literacy and abilities, as numerous academics have pointed out. Two key issues that define the digital divide are (1) expensive and inadequate infrastructure and (2) low or middle-income areas' low levels of digital literacy [16]. Due to high expenses and a general lack of infrastructure, which includes anything from sporadic electricity supplies to a lack of ICT facilities, low- and middle-income communities have restricted access to digital technology [17]. In 2015, it was shown that 33% of South African families did not think using the Internet was necessary.

According to research, kids from low-income households,

Members of underprivileged groups, as well as those residing in rural areas are disproportionately affected by the digital divide, which feeds a vicious cycle of educational disadvantage.

1.1 Digital Literacy

Many different organizations and countries design digital literacy frameworks that are tuned to fit the population they serve and that help people learn. These frameworks have included both technical and social dimensions with the goal of empowering individuals to develop not only technical abilities but also life skills and access to services [18]. They focus on worldwide literacy along with creativity literacy and literacy across many different subjects. An additional crucial element in the majority of frameworks is eSafety. Digital citizenship takes this ball and runs with it, making it so that people get a good grasp not just on rights and responsibilities but also on following the laws and behaving ethically online.

Digital literacy frameworks are emerging worldwide, but they differ based on various local factors. In the USA, these efforts aim to empower individuals and shape educational policies. "The European Digital Competence Framework for Citizens (DigComp), which strives to create 'digitally-competent citizens,' identifies information literacy, communication, content creation, safety, and problem-solving as key skills [19]. It also stresses an essential need to adapt initiatives for regional, local, or national conditions. The diversity of cultures and economics across Europe, along with different national contexts, might make it hard to develop a single European framework. National policies could play a crucial part in using or adjusting outline [20]."

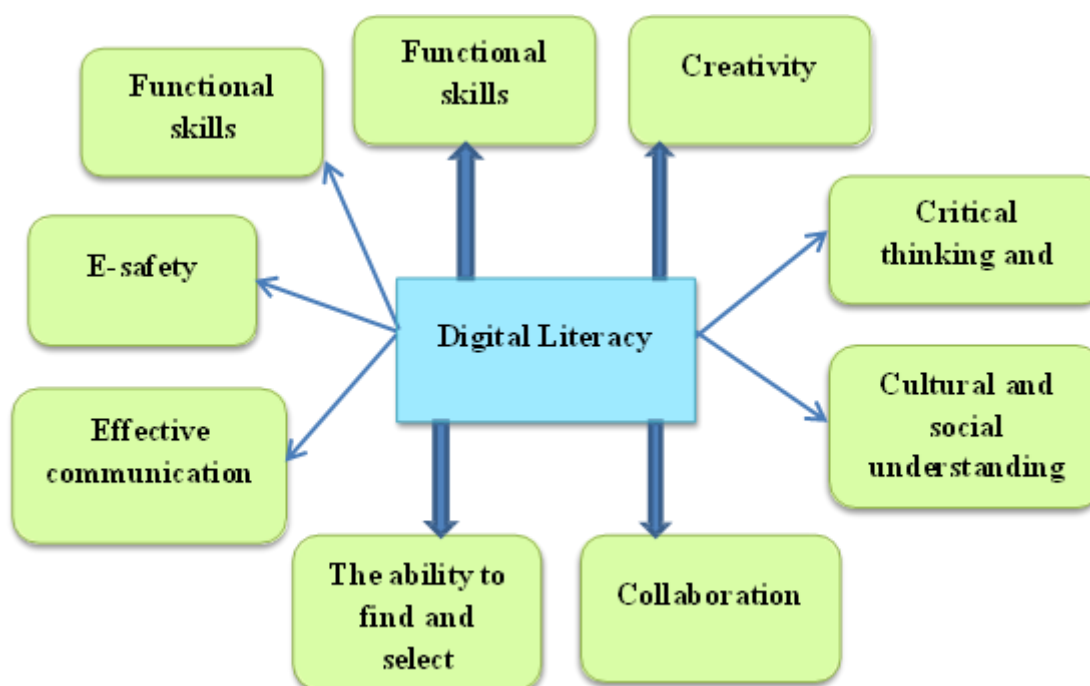


Fig 1: Components of digital divide

1.2 Concept of Digital Divide

Larry Irving Jr. is credited for coining the term "Digital Divide" (Dragulanescu, in Panda, Chhatar, and Maharana). It alludes to the unequal and disproportionate rate at which societies are developing in terms of access to digital services and infrastructure [21]. It is the discrepancy in access to information technology and digital tools and techniques. It shows the difference between individuals who consistently and successfully has access to digital and information technologies and people who don't. It includes differences in how various groups physically access and utilize hardware, resources, technology, and abilities. From an educational standpoint, there can be a digital divide between students and teachers [22]. The idea of the "digital divide" may change over the periods also from place to place. Global, regional, national, and state-level manifestations of this digital divide are possible. Disparities in access to technology among nations are referred to as the "global digital divide" [23]. Disparities in access to technology among regions (continents) are referred to as "regional digital divide." The term "national "Digital divide" refers to how different people's access to technology is between states in a nation, whereas the term "digital divide" describes the disparity in access to technology within a state. In his study, he identified and discussed several aspects of the educational process that may be affected by the digital divide, including service accessibility, knowledge of digital devices and their extent of use, opportunities to learn and use new media, experience, skills, support, disability, linguistic area, gender, and so on [24]. These digital abilities are missing in both teachers and students in the current educational environment. This kind of disparity in educational opportunities and information was a violation of the human right to access education and information (Article 26 (1) of UDHR).

1.3 Challenges in Implementation

Despite these efforts, a number of issues still exist:

Infrastructure Deficits: The lack of basic substructure in many schools, predominantly in rural regions, makes it challenging to integrate ICT.

Maintenance Problems: Schools frequently struggle to update and maintain their equipment, even when digital tools are available.

Teacher Training: In order to give educators, the skills they need to use technology in the classroom, extensive training programs are required.

2. Related works

The drivers of digital literacy that can be taught in higher education and used in the modern digital workplace are examined by Khan, N. et al. in 2022 [25]. Three hundred youths in all answered self-administered questionnaires. The study's conclusions demonstrated that digital literacy is improved by operational abilities, critical thinking, visual learning, group learning, and learning systems. Digital disparities that emerged for online education during the COVID-19 lockdown in five developing nations—India, Pakistan, Bangladesh, Nepal, and

Afghanistan—are highlighted by Mathrani, A. et al. in 2022 [26]. The poor availability of fundamental digital services for sizable populations in emerging nations limits the routine use of digital media. Although ICTs have emerged as important tools for enabling information exchange, carrying out corporate activities, and providing online or remote education, it is impossible to overlook the problem of uneven ICT adoption and spread. The pandemic revealed several types of digital gaps between populations in affluent and underdeveloped nations, even as it emphasized the significance of the digital economy [27]. [28] have claimed that although the virus is not politically or gendered in and of itself, it has brought to light a number of social problems pertaining to gender equity, inclusion, and access. For example, digitalization will not be inclusive and will not give societies equal possibilities if they lack equitable access to the digital tools and resources necessary to establish a consistent online presence. Being the most unequal society in the world, South Africa's income and wealth disparities [29] exacerbate the country's already-existing digital gaps, which in turn impact the digital proficiency of disenfranchised students who find it difficult to obtain and/or adjust to technological advancements. Socioeconomic characteristics, particularly gender, age, race, educational attainment, income, and housing, have been included in previous studies on the disparities brought about by the rise of digital technology [30].

2.1 Survey based on exiting statistical analysis

Tamil Nadu's experience with continuing education throughout the epidemic is covered in the essay by Jafar, K. et al., 2023 [33]. Rural and urban households that experienced a lack of employment during the pandemic restricted access to online learning, according to the results of nonlinear panel analysis using conditional fixed-effects logistic regression. The impact of digital skills (and consequently the knowledge disparities that can identify the potential digital gap) on the adoption of technology related to entrepreneurship (as measured by the Unified Theory of Acceptance and Use of Technology, or UTAUT) is identified by Barra, C. et al. in 2024 [34], with gender being treated as a moderator. The empirical results, which are based on Multiple Group Analysis (MGA) and Structure Equation Modelling (SEM), demonstrate that the desire to employ ICT in entrepreneurial activities is significantly influenced by digital skills and perceptions of technology capabilities. Pakistan's ICT use capacities were surveyed by Shair W. et al. in 2022 [35]. ICT use is a combination of certain digital abilities. Data from the PSLM-HIES survey (2018–2019) was utilized for empirical analysis.

2.2 OBJECTIVES

The objective of this review is based on the digital divide in higher education, which is a challenging one. Digital literacy is a bridging gap in the digital divide because of the use of internet access for learning.

3. METHODOLOGY

This systematic review used One-way ANOVA analysis to find the respondents with more digital literacy. This framework was chosen in order to make the research transparent and repeatable.

3.1 Who has access and who does not?

Every responder in the semi-structured interviews had a computer at home and some sort of Internet connection. In colleges, they, too, had some access, but only in restricted quantities that needed to be shared. The data on the disparity between urban and rural populations was further supported by the respondents [31]. Telephone lines have recently been installed in mountainous and isolated places, and some populations have been disconnected from technology for far longer than in urban areas. The ongoing disparity between rural and urban areas has encouraged young people to relocate to cities in order to have access to contemporary amenities, like the Internet. According to a lecturer at the University of Belgrade [P11], there are pupils who lack access to computers or the Internet. They primarily come from the less developed parts of the nation and utilize computers in the student dormitories.

3.2 Rural and urban Indian context

While around 78% of Indians own a mobile phone, just 57% do so in rural areas [32]. Approximately 68% of upper-level pupils have access to cell phones. The most difficult situation is when courses are held for pupils who left for home during the crisis. While students from rural families only have an online connection, students from urban households are more likely to have internet access. Just 28% of pupils from rural homes are

likely to have access to the internet at home. In contrast, 42% of urban families have internet access and a computer, while 23.4% of rural homes have both. In rural areas, the number of households with internet access and a computer is 14.9%. The number of computers and internet connections in rural and urban households differs significantly.

3.3 Review Questions

The purpose of this review paper is to examine the new idea of digital literacy, its effects on higher education, and its active elements in India. Thus, this study examined the following research questions:

1. How have different researchers defined digital literacy?
2. How have the components of digital literacy evolved?
3. What is the role of digital literacy in higher education, particularly in India?
4. Which components of digital literacy are active in India?
5. How significant is digital literacy in India's higher education system?

4. Data analysis

Here, secondary data analysis is carried out to take the survey of respondents (students and teachers). In total, 200 rural and 150 urban students were taken for this survey.

5. Review analysis

The previous findings on digital literacy and the digital divide in higher education are explained in this section. The socioeconomic status and geographic location of the students with and without access were considered.

Table 1: Substantial variances in technology access among students

Category	Percentage with Access	Percentage without Access
Overall Access	76	28
Socioeconomic Status		
High-Income Families	86	15
Low-Income Families	40	65
Geographic Location		
- Urban Area	82	20
Rural Areas	60	40
Academic Performance (with access)	20% higher on average	-

Significant differences in pupils' access to technology across a range of socioeconomic backgrounds are seen in Table 1. Just 15% of pupils from more affluent families have reliable internet at home, compared to about 65% of students from

underprivileged families. Additionally, a geographical digital divide was highlighted by the fact that 40% of pupils in rural locations reported having insufficient access to high-speed internet.

Table 2: Impact on Academic Performance

Student group	Access to technology	Average score improvement	Percentage Impact on Academic Performance
Students with consistent access	yes	+20% improvement	Positive (20% higher on standardised tests)
Students with limited/no access	No	Baseline 0%	Negative (20% lower compared to students with access)
Low-Income Students	Limited	-20%	Negative (20% lower than higher-income students)
Rural Area Students	Limited	-15%	Negative (15% lower due to inadequate internet access)

As explained in Table 2, the analysis revealed a link between academic success and access to technology. On average, students who had regular access to technology performed 20% better on standardized tests than students who had limited or no access. This discrepancy was especially noticeable in fields like science and math, which depended significantly on digital tools.

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